Exhibit 2

CONFIDENTIAL

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

GARY KOOPMANN, TIMOTHY KIDD and VICTOR PIRNIK, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, v. FIAT CHRYSLER AUTOMOBILES N.V., FCA US LLC, SERGIO MARCHIONNE, SCOTT KUNSELMAN, MICHAEL DAHL, STEVE MAZURE and ROBERT E. LEE, Defendants.	No. 15 Civ. 7199 (JMF)

REBUTTAL EXPERT REPORT OF NICK MOLDEN
September 26, 2018

TABLE OF CONTENTS

I. QUALIFICATIONS

1. I am the founder and chief executive officer of Emissions Analytics Ltd, a company specialising in vehicle emissions and fuel economy testing. Since its foundation in 2011, the company has conducted independent testing and has published this data in order to give insight to participants in the marketplace.

2. Emissions Analytics is a commercial company, headquartered in the United Kingdom, with a wholly-owned subsidiary in the United States and a joint venture company in the Republic of South Korea. Its business model is to sell access to a database containing emissions and fuel economy data, and conduct customer testing for a range of clients.

3. Clients of Emissions Analytics include automakers, suppliers to automakers, regulators, governments, vehicle fleets, universities, financial institutions and fuel companies.

4. I am responsible for the operations of Emissions Analytics, including technical operations, databased development, data analysis, sales, and business operations. I am supported by a team located in the U.K, Germany, and the U.S.

5. My particular expertise is in the development of test methodologies, data analysis, and communication of results to different audiences.

6. I am a graduate of the University of Oxford, with an MA (Hons) in Philosophy, Politics and Economics, focusing on public and industrial economics. Those skills were then applied to a career in business, progressively focusing on automotive data.

7. In 2005, I set up a data analysis firm called Oxford Indices Ltd. The firm focused primarily on automotive data analysis, including product pricing, residual values and promotions.

8. In 2011, I founded Emissions Analytics to focus on emissions testing data in the automotive industry. This grew out of my prior data analysis work by bringing together Portable

Emissions Measurement Systems ("PEMS") with data analysis techniques. After incorporation, I recruited a team of qualified technical and data analysis personnel with the aim of becoming the best in PEMS testing. Since starting, Emissions Analytics has conducted PEMS testing on approximately 2000 vehicles.

9. Since 2016, Emissions Analytics has published the "EQUA Index," which is a free-access vehicle ratings system for both the E.U. and U.S., based on Emissions Analytics' test data. The index results can be found at www.equaindex.com, along with a description of the test methodology.

10. The main activities I undertake as chief executive of Emissions Analytics are final publication authority on test results, developing new test methodologies and data analytical techniques, presenting results at industry and financial conferences, and liaising with major clients.

11. I am chairman of an expert workshop under the European Committee for Standardisation ("CEN"), which was initiated in November 2017 and is aimed at standardising the data collection method underlying comparative vehicle ratings.

12. See Appendix A for my curriculum vitae and Appendix B for a complete list of my publications authored in the last 10 years.

II. ASSIGNMENT

13. I have been retained by counsel for Fiat Chrysler Automobiles, N.V. ("FCA") to respond to certain opinions expressed in the August 15, 2018 report of Plaintiffs' expert Dr. Axel Friedrich (the "Friedrich Report"). In particular, I have been asked to assess Dr. Friedrich's methodology and basis for reaching his conclusion that FCA was not in compliance with

European emissions regulations during the Class Period, which I understand to be October 13, 2014 through May 23, 2017.[1]

14. In forming my opinions, I relied on my extensive experience as a practising professional in emissions testing in the automotive industry. I also reviewed data and documents from various sources such as emissions test reports from the Kraftfahrt-Bundesamt ("KBA") – the Federal Motor Transport Authority in Germany – including those Dr. Friedrich relied on in his August 15, 2018 report. A list of documents and data that I considered in forming my opinions is attached as Appendix C.

15. I have not previously testified in any deposition or trial.

16. The opinions expressed in this report are my own. I am being compensated for my time and services at my regular hourly rate of $650. I have been assisted in this matter by the staff of Cornerstone Research, who worked under my direction. My compensation in this matter is not contingent or based upon the content of my opinions or the outcome of this matter. I reserve the right to update my opinions and analysis if additional information becomes available or in response to any additional opinions offered by Plaintiffs' experts.

III. EMISSIONS REGULATIONS IN THE EUROPEAN UNION

17. E.U. Commission Regulation (EC) No. 715/2007 sets the emissions standards and introduction dates for the Euro 5 and Euro 6 stages, including limits relating to the emissions of nitrogen oxides ("NO_x") from light duty vehicles.[2]

18. During the Class Period, vehicles needed to meet these emissions levels while undergoing testing during the New European Drive Cycle ("NEDC").[3] The regulation further

[1] I was not asked to, nor am I, offering any opinions in this report about whether any FCA vehicles are, or are not, in compliance with E.U. emissions regulations.

[2] Council Regulation 715/2007, art. 10, 2007 O.J. (L 171) [hereinafter EC 715/2007]; *id* at App. 6.

requires that: "[t]he manufacturer shall equip vehicles so that the components likely to affect emissions are designed, constructed and assembled so as to enable the vehicle, in normal use, to comply with this Regulation and its implementing measures."[4]

19. As discussed further below, EC 715/2007 also provides that "[t]he use of defeat devices that reduce the effectiveness of emission control systems shall be prohibited."[5] This prohibition contains certain exceptions, in particular where the "need for the device is justified in terms of protecting the engine against damage or accident and for safe operation of the vehicle."[6]

IV. DEFEAT DEVICES

20. EC 715/2007 defines "defeat device" as "any element of design which senses temperature, vehicle speed, engine speed (RPM), transmission gear, manifold vacuum or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system, that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use."[7]

21. EC 715/2007 provides that "[t]he use of defeat devices that reduce the effectiveness of emission control systems shall be prohibited."[8]

22. There are three exceptions to the prohibition on defeat devices. Specifically, "[t]he prohibition shall not apply where (a) the need for the device is justified in terms of protecting the engine against damage or accident and for safe operation of the vehicle; (b) the device does not function beyond the requirements of engine starting; or (c) the conditions are substantially

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[3] Commission Regulation 692/2008, 2008 O.J. (L 199).
[4] EC 715/2007, *supra* note 2, art. 5, at 1.
[5] *Id.* art. 5, at 2.
[6] *Id.* art. 5, at 2(a).
[7] *Id.* art. 3, at 10.
[8] *Id.* art. 5, at 2.

included in the test procedures for verifying evaporative emissions and average tailpipe emissions."[9]

23. Neither EC 715/2007 nor any other European regulation in effect during the Class Period provided any additional definitive information about these three exceptions, or the criteria for determining whether the exceptions were applicable in a given case.[10]

24. In my opinion, given the lack of guidance on how the exceptions to the defeat device prohibition should be interpreted, along with the inherent vagueness in the plain language of the exceptions, the application of the defeat device prohibition is ambiguous in a given case.

25. This position is supported by the KBA Report, relied on by Dr. Friedrich, which recognizes that the defeat device "provision lacks sufficient clarification and legal certainty."[11]

26. For example, the exception for protecting the engine (exception (a) in ¶ 22, above) in the regulation is ambiguous in a number of respects. *First*, the exact scope of what is meant by "engine" is unclear, including as to what degree components such as turbochargers and exhaust gas recirculation ("EGR") valves come within that concept. *Second*, the nature of the damage to be protected from is unspecified. *Third*, the extent of engine damage a manufacturer must allow before the use of a defeat device is acceptable is not quantified.

27. Indeed, protection of the engine and its components is crucial, as fouling by the build-up of solid matter or by the effects of water condensation can lead to reduced function of the emissions control system. As the KBA Report recognizes, "strategies designed to ramp out the amount of EGR can be ultimately considered as measures to ensure emission control" because

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[9] *Id.*

[10] Rep. by the "Volkswagen" Comm. of Inquiry, Fed. Ministry of Transp. and Digital Infrastructure, at 122 (April 2016) [hereinafter "KBA Report"]; Int'l Council on Clean Transp. [ICCT], *Defeat Devices under the U.S. and EU Passenger Vehicle Emissions Testing Regulations*, at 3 (March 2016), https://www.theicct.org/sites/default/files/publications/ICCT_defeat-devices-reg-briefing_20160322.pdf.

[11] KBA report, *supra* note 10, at 122.

"independent research" has confirmed that "[t]he formation of a deposit or lacquer may lead to a failure of the EGR valve and clog the EGR cooler," which "will lead to a substantial reduction in the amount of EGR which in turn implicates an increase in NOx."[12]

28. In addition, as noted, a defeat device is defined as a design element that reduces the effectiveness of an emission control system during "normal use."[13]

29. The regulations do not define "normal use" and there is no general consensus on its meaning. For instance, the KBA report, which the Friedrich Report cites, acknowledges that the term is "linguistically very vague" and "allows room for interpretation."[14] Further, the KBA report suggests: "It would have been advisable that the European legislature had specified and explained the constituent element of 'normal use' at the time of the entry into force of Regulation EC 715/2007, with regard to what it entails and how such 'normal use' is to be simulated."[15]

30. Based on my personal experience, normal use could take at least three different meanings. *First*, it could mean that driving on average must be in line with average driving across Europe. *Second*, it could mean that driving on average should be no more extreme (but potentially less extreme) than average European driving. *Third*, it could mean that driving should be in line with the average driving in the country in which the driving takes place – given that driving conditions and styles differ between countries in the EU.

V. EMISSIONS TESTING ALONE CANNOT ESTABLISH THE PRESENCE OF A PROHIBITED DEFEAT DEVICE

31. There are many potential explanations of elevated emissions in real-world operation compared to regulatory limits, without the presence of an unlawful defeat device.[16]

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[12] KBA report, *supra* note 10, at 18–19.
[13] EC 715/2007, *supra* note 2, art. 5, at 1.
[14] KBA Report, *supra* note 10, at 122.
[15] *Id.*
[16] Int'l Council on Clean Transp. [ICCT], *The Real Urban Emissions (TRUE) Initiative Vehicle Rating*, at 2-3 (June 2018), https://www.theicct.org/sites/default/files/TRUE_vehicle_rating_factsheet_20180604_0.pdf.

32. As an initial matter, maintenance issues with the test vehicle may result in increased emissions levels. For example, parts may have been replaced with defective or non-approved components, and those repairs may not have been recorded in the service history of the vehicle.[17]

33. When the vehicle is started after a long period switched off, the engine will be cold. For a diesel engine, it is likely that NO_x emissions will be elevated for up to 15 minutes. In tests published by Emissions Analytics, after one minute of operation NO_x emissions were on average 32% higher than the emissions when the engine is warm.[18]

34. All diesel vehicles from Euro 5 onwards in practice are equipped with a diesel particulate filter. Most of these filters undergo a periodic "regeneration," during which the material collected in the filter is incinerated and exhausted from the vehicle. During this period, NO_x emissions are typically 3.3 times higher for Euro 6 diesels.[19] Usually it is possible to identify and exclude these periods of regeneration from test results by identifying elevated exhaust temperature. But there are cases where regenerations are attempted by the vehicle without the signature exhaust temperature. Therefore, it is possible for test results to include some elevated emissions from regenerations.

35. The NEDC laboratory test results can also be artificially low due to the use of certain allowances and tolerances permitted under the regulation. The rollers of the dynamometer are configured with values that are intended to mimic the rolling resistance of the car when driven on the road. These values are determined from a "coast down test," which takes place on a track and involves allowing the vehicle to coast down, out of gear, from a higher speed to a low speed,

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[17] *Id.*

[18] Newsletter, Emissions Analytics, *Why Cold Starts Could Freeze Air Pollution Improvements* (July 6, 2017), https://www.emissionsanalytics.com/news/can-driving-styles-prove-the-smarter-route-to-better-fuel-economy-and-emissions-lr5c2.

[19] Newsletter, Emissions Analytics, *Real Driving Emissions is a Tough Regulation, but also a Risky One* (July 18, 2018), https://www.emissionsanalytics.com/news?month=July-2018.

from which the inertial values are calculated or looked up from official reference tables. During the coast down test, manufacturers are permitted to implement strategies such as eliminating as much weight from the vehicle as possible, maximising permitted tire pressures, and using test tracks at advantageous altitudes. The use of these strategies during the coast down test and the input of the resulting values into dynamometer testing can ultimately increase the difference between laboratory certification and real on-road test results.[20]

36. Driving outside of the dynamic boundaries in the certification test can lead to significantly elevated emissions. This may be due to higher speeds, higher rates of accelerations, steeper gradients or suboptimal gear shift strategies. For example, in results cited by Emissions Analytics, by driving on the motorway at up to 160 kph rather than just 110 kph, the average increase in NO_x across eight diesel vehicles was 552%.[21] Vehicles 7 and 8 in the analysis show particularly high variance between the two maximum speeds, with the higher speed scenario showing NO_x emissions around ten times greater.

37. The KBA report cited in the Friedrich Report highlights these dynamic factors and also identifies potential effects from the higher vehicle weight: "In principle, the results of the PEMS on-the-road measurements were higher than the measurement results on the dynamometer, which is due to the impact of higher loads (road load, higher mass because of two test persons inside, PEMS, test device and mass of the optional equipment)."[22] "However, this in itself does not constitute legal non-conformity since the NO_x threshold value only applies to the statutory Type

[20] Int'l Council on Clean Transp. [ICCT], *Real World Emissions in 2020 and Beyond, Impacts of WLTP and Emerging Technologies*, at 3 (June 9, 2016), https://www.transportenvironment.org/sites/te/files/Real%20world%20emissions%20in%202020%20and%20beyond%20-%20ICCT%20-%20Alex%20Stewart.pdf.

[21] Newsletter, Emissions Analytics, *Discrepancies between Best and Worst Diesel Cars Reaches Record High* (June 22, 2018), https://www.emissionsanalytics.com/news/discrepancies-between-best-and-worst-diesel-cars-reaches-record-high.

[22] KBA Report, *supra* note 10, at 18.

1 test[23] including all boundary conditions."[24] During his deposition, Dr. Friedrich conceded that this statement is correct.[25]

38. Thus, without inspecting the test vehicle (including its electronic and physical control systems), it is not possible to definitively identify the cause of excessive emissions identified in a vehicle test.

39. Dr. Friedrich concedes that he did not perform any inspections or analyses of the actual vehicles tested in the regulator reports that he cites.[26]

40. Moreover, even if one were to establish that the increased emissions identified in a vehicle test resulted from an emissions control device present in the test vehicle, it is then necessary to analyse whether that emissions control device falls within one of the three defeat device exceptions specified in EC 715/2007. For example, if the emissions control device is "justified in terms of protecting the engine against damage," then the device is not an unlawful defeat device under EC 715/2007.[27]

41. Dr. Friedrich admits that he did not consider whether any of the three defeat device exceptions in EC 715/2007 applied to the vehicles in the tests on which he relies.[28]

42. Thus, without inspection of and complete visibility into electronic and physical controls systems, it cannot be proven that increases in NO_x emissions are caused by an unlawful defeat device.

[23] This is a the certification test based on the NEDC test. *See id.*
[24] *Id.*
[25] Friedrich Dep. 212:17–23.
[26] Friedrich Dep. 175:11–19, 192:14–193:15, 237:20–238:9.
[27] EC 715/2007, *supra* note 2, art. 5, at 2(a).
[28] Friedrich Dep. 294:3–12, 297:12–25, 317:12–21, 323:7–324:10.

43. Further, Dr. Friedrich acknowledged at his deposition that before a regulator can make a determination of non-compliance, "legally, you have to discuss the results with the manufacturer; otherwise, you cannot take legal action."[29]

44. In keeping with that requirement, the Dutch, German and French reports all noted that car manufacturers were given opportunities to discuss emissions results and any emissions control strategies contained in their vehicles.[30]

45. Dr. Friedrich admitted that he did not speak to FCA about the results of any of the vehicle tests he cites.[31]

46. In summary, vehicle emissions testing alone cannot support the conclusion that a given vehicle contains an unlawful defeat device.

VI. NONE OF THE REPORTS RELIED ON IN THE FRIEDRICH REPORT CONCLUDED THAT ANY FCA VEHICLE CONTAINED AN UNLAWFUL DEFEAT DEVICE.

47. In support of his opinion that FCA vehicles were not in compliance with E.U. emissions regulations, Dr. Friedrich relies on emissions tests conducted by the Deutsche Umwelthilfe ("DUH"), and reports published by German, Dutch and French regulators. In my opinion, none of these reports are sufficient to demonstrate that FCA failed to comply with E.U. emissions regulations.

48. The tests conducted by DUH and referenced in the Friedrich Report, which were overseen by Dr. Friedrich, were limited to measuring tailpipe emissions of certain vehicles during various testing protocols. As demonstrated above at ¶¶ 22–24, 31–46, elevated tailpipe

[29] Friedrich Dep. 239:6–9.
[30] Ministère de l'Environnement, de l'Energie et de la Mer, *Rapport Final de la Commission Independante Mise en Place par la Ministre Segolene Royal après la Revelation de l'Affaire Volkswagen,* at 6 (July 29, 2016) [hereinafter "MEEM Report"]; Rijksdienst voor het Wegverkeer (RDW), *RDW Emission Test Programme: Results of the Follow-up Investigation into the Presence of Unauthorised Defeat Devices*, at 3 (July 2017) [hereinafter "RDW Report"]; KBA report, *supra* note 10, at 18.
[31] Friedrich Dep. 294:21–295:10, 332:22–333:21.

emissions alone cannot establish whether a vehicle is not in compliance with E.U. emissions regulations. Such a determination would require, at a minimum, examination of vehicle calibrations and emissions control software, as well as evaluation of whether a permitted exception justifies the level of NO_x emissions. As Dr. Friedrich conceded during his deposition, he did not consider or examine the calibrations or software on any of the vehicles he tested, nor did he evaluate whether any emissions control strategy in any FCA vehicle fell within the regulatory exceptions.[32] Accordingly, the DUH testing is insufficient to demonstrate that any FCA vehicle is not in compliance with E.U. emissions regulations.

49. The regulator reports on which Dr. Friedrich relies also do not demonstrate that any FCA vehicle was not in compliance with E.U. emissions regulations. *First*, for certain FCA vehicles, the regulators did not find the vehicles to be out of compliance with EU emissions regulations. For example, the Dutch RDW report cleared two variants of the Jeep Wrangler as well as the Suzuki SX4 (which uses an FCA powertrain) because "reduced operation of the emission control system [was] necessary for engine protection."[33] As a result, the RDW stated that it had "conclud[ed] the investigation" of these vehicles.[34] The KBA report found that FCA explained the elevated NO_x emissions in the Fiat Panda "in a technically plausible and acceptable manner" because it reduced EGR "to avoid the thermal overload of the particulate filter for certain driving conditions."[35] The KBA placed the Fiat Panda in "Group 1" in its report, which meant that the Fiat Panda either contained no "anomalies" or that FCA could "explain certain anomalies with regard to the amount of NOx in a technically plausible and acceptable manner."[36]

[32] Friedrich Dep. 294:3–12, 297:12–25, 317:12–21, 323:7–324:10.
[33] RDW Report, *supra* note 30, at 6.
[34] *Id.* at 23, 34.
[35] KBA report, *supra* note 10, at 18, 32.
[36] *Id.* at 18.

50. *Second*, for other FCA vehicles, the regulators explicitly stated that further information was needed before conclusions could be drawn about the vehicles. For example, the German KBA report states that FCA provided justifications based on engine protection for NO_x emissions from the Alfa Romeo Giulietta, Fiat Ducato, Jeep Cherokee, and Suzuki Vitara.[37] The Dutch RDW report notes that FCA provided similar justifications for the Jeep Grand Cherokee, and Suzuki Vitara.[38] Both regulators observed that further investigation was necessary before any conclusions could be made about these vehicles.[39] Further, the French report stated that it "did not demonstrate the illegal defeat devices at this stage" and it required "further investigation."[40]

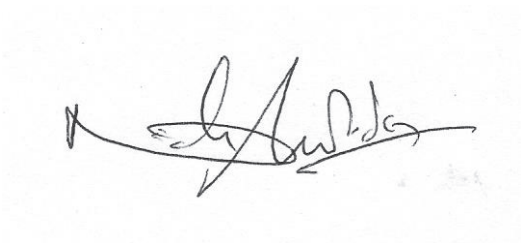
51. Accordingly, none of the regulator reports relied on by Dr. Friedrich concluded that FCA was not in compliance with E.U. emissions regulations.[41]

VII. CONCLUSION

52. Based on the foregoing, in my opinion, Dr. Friedrich's report fails to demonstrate that FCA was not in compliance with E.U. emissions regulations.

[37] *Id.* at 70, 78, 90, 108.
[38] RDW Report, *supra* note 30, at 5, 35–36, 39.
[39] *Id.* at 3, 5; KBA Report, *supra* note 10, at 18–19, 128.
[40] MEEM Report, *supra* note 30, at 25.
[41] *Id.*; RDW Report, *supra* note 30; KBA Report, *supra* note 10, at 32, 70, 78, 90, 108.

Executed this 26th day of September 2018



Nick Molden

Appendix A

Curriculum Vitae Nick Molden

Date of birth	[redacted]	Nationality	British
Home address	[redacted] Hampshire, [redacted]	telephone mobile e-mail	[redacted]

Current activities

2011- *Founder and Chief Executive Officer, Emissions Analytics Ltd*
Specialist in independent real-world emissions and fuel economy testing of vehicles, with bases internationally. Publishes the EQUA Index.

2006- *Founder and Managing Director, Oxford Indices Ltd*
Data analysis specialist focusing on the automotive and retail industries.

Previous employment

2005-14 *Non-executive director, Salisbury International Arts Festival*
Advising on commercial strategy to increase ticket and sponsorship sales, and broader strategic and artistic development. The Salisbury Festival is the second largest multi-arts festival in the UK.

2004-5 *Director of Business Development, United Advertising Publications plc*
Leading all development activity for this UK publishing division of United Business Media, including acquisitions, organic investment, online business development and process improvements. Team of 25. Board member, reporting to divisional MD.

Achievements:
- Led £21m acquisition of *The Publican* magazine and related assets from Quantum Business Media
- Strategic review of car classified assets, leading to £50m sale
- Reorganised and improved efficacy of new media team.

2001-4 *Group Development Manager, United Business Media plc*
Responsibilities covering group and divisional strategy development for subsidiaries in the UK, USA, Europe and Asia, plus broadcasting assets such as Channel Five.

Managed, valued and analysed acquisitions and organic investments across the group. Presented recommendations to the CEO and Board. Skills in market/strategic analysis and commercial evaluation.

Additionally, from 2003, responsible for investor and press relations. Investor and analyst contact through presentations and face-to-face meetings. Press relations and corporate announcements.

Key achievements:
- Managed seven acquisitions, one disposal and two additional investments – largest almost £200m
- Extensive organic investment programme generating revenues of £40m per annum
- Rigorous application of financial criteria and business planning to maximise value creation.

Appendix A

2000-1 *Business Development Manager, Brand Republic, Haymarket Business Publications Ltd*

Developed business plan to launch on-line marketing portal, bringing together all Haymarket's relevant print titles. Responsible for commercial and technical development and launch of site.

Key achievements:

- Won PPAi Best New Launch award
- Launched site on time and on budget
- Overtook rival to become market leader
- Negotiated agreements with content partners.

1998-2000 *Business Development Manager, Haymarket Publishing Group Ltd*

Responsible for assessment and development of launch and acquisition proposals across the Group (business and consumer publishing and exhibitions). Provided analysis for development of operational policies and on-line strategy.

Key achievements:

- Developed Group growth strategy plan
- Three major new launches and two acquisitions
- Developed Car Price Index for *What Car?* – economic indicator used by Monetary Policy Committee et al.

1997-98 *Managing Director, Oxygen 107.9fm Ltd*

In charge of all executive aspects of the radio station, including programming, personnel (employees and volunteers), sales and fund-raising, marketing and strategy.

Key achievements:

- Managed staff of four plus team of 100+ volunteers
- Delivered major sponsorships including with Reuters
- Ensured compliance with Radio Authority licence
- Managed operating board and trustees pro-actively
- Conducted sales process that resulted in £0.7m transaction.

1994-97 *Co-founder and Business Development Director, Oxygen 107.9fm Ltd*

Set up project to establish the first student-run FM radio station. Board director, responsible for sales and procurement, including transmitter and studio facilities.

Key achievements:

- Lobbied regulator to advertise licence in Oxford
- Raised £200,000 initial finance
- Compiled successful application document
- Created board of trustees of key industry figures.

Education

1992-95 *Christ Church, Oxford University, reading Philosophy, Politics & Economics: MA (Hons.)*

Degree	First in Final Examinations
	Distinction in Preliminary Examinations
Prizes	Gladstone Scholar, 1993-95

Summer 1992 *Sorbonne, Paris*

French language course, 'Niveau Supérieur'.

1986-92 *Royal Grammar School, High Wycombe*

A Level	6 at grade A

Appendix A

Recent Publications

September 2016	University of Cambridge: *Research data supporting "Engine maps of fuel use and emissions from transient driving cycles"* https://www.repository.cam.ac.uk/handle/1810/257503
November 2016	Atmospheric Environment: *A Portable Emissions Measurement System (PEMS) study of NOx and primary NO2 emissions from Euro 6 diesel passenger cars and comparison with COPERT emission factors* http://www.sciencedirect.com/science/article/pii/S13522310163072X
December 2016	Applied Energy: *Engine maps of fuel use and emissions from transient driving cycles* https://www.sciencedirect.com/science/article/pii/S0306261916312843
July 2017	University of Lancaster: *In-Cabin Air Quality and Ride Comfort* http://eprints.lancs.ac.uk/87218/
April 2018	Science of The Total Environment: *Real world CO2 and NOx emissions from 149 Euro 5 and 6 diesel, gasoline and hybrid passenger cars* https://www.sciencedirect.com/science/article/pii/S0048969717333296

Appendix B

Publications Authored in the Last Ten Years

Rosalind O'Driscoll, Marc E.J. Stettler, Nick Molden, Tim Oxley, Helen M. ApSimon (2018). "Real world CO_2 and NO_x emissions from 149 Euro 5 and 6 diesel, gasoline and hybrid passenger cars." Science of Total Environment. Vol. 621, April 2018: 282-290.

Douglas Booker, Nick Molden, (2018). "Vehicle Interior Air Quality Dynamics". Lancaster University. (Conference paper, published).

Douglas Booker, Nick Molden, Dr Ian Marshall, Dr David Booker (2017). "Quantifying Solid and Total Particle Number Concentrations from an Array of Vehicles Using the 'Plume Chaser Method'." Lancaster University. (Conference paper, published).

Douglas Booker and Nick Molden, (2018). "Vehicle Interior Air Quality: Ultrafine Particles." ETH Zurich Combustion Generated Nanoparticles. Lancaster University. (Conference paper, published).

Douglas Booker, Nick Molden, David Booker (2017). 'In-Cabin Air Quality and Ride Comfort.' In: CRC Real World Emissions Workshop, March 2017.

Douglas Booker and Nick Molden, Charlotte Farr (2018). "Vehicle Interior Air Quality: Volatile Organic Compounds." Lancaster University. (Conference paper, published).

Rosalind O'Driscoll, Helen M. ApSimon, Tim Oxley, Nick Molden, Marc E.J. Stettler, Aravinth Thiyagarajahd (2016). "A Portable Emissions Measurement System (PEMS) study of NO_x and primary NO2 emissions from Euro 6 diesel passenger cars and comparison with COPERT emission factors." Atmospheric Environment Vol. 145, Nov. 2016: 81-91.

J. D. K. Bishop, M. E. J. Stettler, N. Molden, A.M. Boies (2016). "Research data supporting 'Engine maps of fuel use and emissions from transient driving cycles'". University of Cambridge. https://doi.org/10.17863/CAM.1736

Nick Molden (2017). "Very cleanest cars revealed: new A+ rating from the EQUA Index". http://www.emissionsanalytics.com

Nick Molden (2017). "Emissions Reduction Potential from Smoother Driving". http://www.emissionsanalytics.com

Nick Molden (2017). "Electric vehicles now rated by EQUA Index – Tesla 3 result". http://www.emissionsanalytics.com

Nick Molden (2018). "Cutting pollution and improving public health". http://www.emissionsanalytics.com

Nick Molden (2018). "Rethinking scrappage for addressing vehicle emissions". http://www.emissionsanalytics.com

Nick Molden (2018). "New Real Driving Emissions regulation increases pressure on annual inspection and maintenance". http://www.emissionsanalytics.com

Appendix B

Publications Authored in the Last Ten Years

Nick Molden (2018). “Discrepancies between best and worst diesel cars reaches record high”. http://www.emissionsanalytics.com

Nick Molden (2018). “Real Driving Emissions is a tough regulation, but also a risky one”. http://www.emissionsanalytics.com

Appendix C

Documents Considered

Document Title	Document Date
Legal Documents	
Fourth Amended Complaint for Violations of the Federal Securities Laws, *Gary Koopmann, Timothy Kidd and Victor Pirnik, Individually and on Behalf of All Others Similarly Situated v. Fiat Chrysler Automobiles N.V., FCA US LLC, Sergio Marchionne, Richard Palmer, Scott Kunselman, Michael Dahl, Steve Mazure, and Robert E. Lee*	24 August 2017
Expert Reports	
Expert Report of Axel Friedrich	15 August 2018
Depositions	
Deposition of Axel Friedrich	14 September 2018
Research Studies and Reports	
"NOx emission measurements of a diesel passenger car Fiat 500X 2.0 MJ 4WD4, EURO 6," Deutsche Umwelthilfe	February 2016
Rachel Muncrief, John German, and Joe Schultz, "Defeat devices under the U.S. and EU passenger vehicle emissions testing regulation," The International Council on Clean Transportation (ICCT)	March 2016
"Rapport final de la commission indépendante mise en place par la Ministre Ségolène Royal après la révélation de l'affaire Volkswagen," Ministère de l'Environnement, de l'Énergie et de la Mer	29 July 2016
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